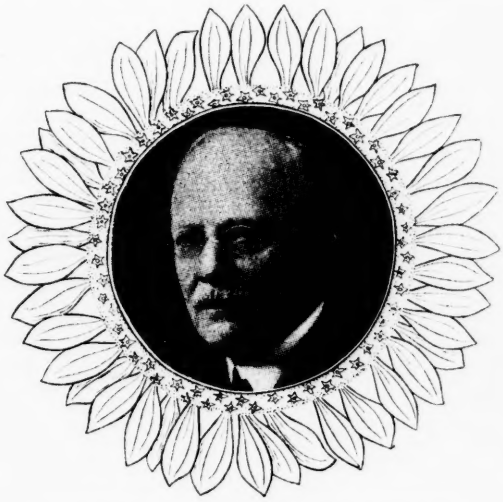
VOL. 10. APRIL, 1937. NO. 2.

Journal
OF THE
Kansas Entomological Society

PUBLICATION COMMITTEE

PAUL B. LAWSON, Editor, Lawrence
ROGER C. SMITH, Manhattan R. H. PAINTER, Manhattan
W. KNAUS, McPherson DWIGHT ISELY, Fayetteville, Ark.



SAMUEL WENDELL WILLISTON
1852 - 1918

Entered as second-class matter December 31, 1927 at the Post-Office at McPherson, Kansas, under the Act of August 24, 1912.

Kansas Entomological Society

Vol. 10, No. 2. April, 1937.

SOME NEW SPECIES MICROVELIA (VELIIDAE, HEMIPTERA)

A. P. McKINSTRY

(Concluded from Vol. 10, No. 1)

Data on Distribution:

South America

Brazil; Rio de Janeiro, Dr. A. Lutz.

Location of Type: Holotype, Allotype, apterous male and female, Brazil, S. A., Rio de Janeiro, Dr. A. Lutz, in Francis Huntington Snow Entomological Collection, University of Kansas. Several **paratypes.**

Comparative Notes: This species is like **M. hungerfordi** n. sp. in genitalia, last sternite, shape of legs, thorax and head, but the third and fourth segments are much longer and thinner than the latter. Also in **M. hungerfordi** n. sp. midtarsal segment 1 is shorter than hind tarsal segment 1, while they are equal in this species. This species (**M. braziliensis** n. sp.) and **M. hungerfordi** n. sp. are unique in the possession of a keel-like ridge on the last sternite of the males.

Microvelia cerifera n. sp

Size: Apterous form, length, 2.2 mm., width .9 mm.

Color: Markings same as **M. fontinalis.**

Structural Characteristics: Antennal formula—1:2:3:4::80:52:66:112.

Tarsi; protarsal segment longest, mid-tarsal segment 1 about as long as segment 2 less distance beyond junction of claws to apex. Hind tarsi same as above. No comb on apex of hind tibia. **Thorax;** protergum covering all of meso and metatergum except lateral triangular metatergites or metanotal angles. Longest distance between eyes very slightly shorter than length of protergum at median line; ratio 25:27 respectively. **Abdomen;** 7th abdominal tergite of male wider than long, shorter than 6th plus 5th. Anal lid with lateral processes having brushes at tip. Female abdomen not normally reflexed over abdominal tergites.

Location of Types: Holo and **Allotype,** apterous male and female, Scott Co., Kansas, 6-19-25, R. H. Beamer, 15 **paratypes,** same locality.

Comparative Notes: This species has been confused with **M. fontinalis** Bueno. The male genitalia, viewed externally will separate them upon close examination, and antennae will also serve since in **M. fontinalis** Bueno, segment 1 is very nearly equal to 2, while in **M. cerifera** n. sp. segment 1 is noticeably longer than 2. The Antennal formula for **M. fontinalis** Bueno is—1:2:3:4::64:60:66:122.

Data on Distribution:

Kansas: Scott Co., 6-19-25, R. H. Beamer; Cheyenne Co., 7-1-26, R. H. Beamer.

Colorado: Ft. Collins, 5-12-99.

New Mexico: Torrance Co., July 1925, C. H. Martin.

Microvelia guatemalensis n. sp.

Size: Apterous male, 2.2-2.5 mm. long, .8 mm. wide; winged male, 2.4-2.6 mm. long, 1 mm. wide.

Color: Ground color dark brown, markings in yellow-orange. Transverse neck spot present in both forms. Apterous thoracic tergum without other orange markings. Winged protergum with posterior lateral margins orange-yellow, not meeting at median line. Connexivum marked with orange. Legs brown, bases yellow. Wings brown, veins dark brown. Venter lead-blue.

Structural Characteristics: Antennal formula—1:2:3:4::17:18:23:20.

Legs; femorae very slightly swollen, fore and hind femora of males without spines. Hind tibia with round brush mounted on barely perceptible pedicel. **Tarsi;** mid-tarsal segment 1 shorter than 2. Hind tarsal segments equal. **Thorax;** apterous protergum not projecting over mesotergum. **Abdomen;** seventh abdominal tergite as wide as long, slightly shorter than tergites 5 plus 6. **Genitalia;** First genital segment with irregular brush of anteriorly pointing hairs on ventral surface. Posterior ventral margin slightly truncate. On median line, cephalad of brush of hairs, four black dots show in cleared mounts.

Location of Type: Holotype; Holomorphotype; Guatemala Salto Escuintla. 1934, F. X. Williams, in Francis Huntington Snow Entomological collection, University of Kansas. Four **Paratypes.**

Comparative Notes: Apterous thorax similar to others of Group I. This is the only species of the group that lack spines on both fore and hind femur of the male.

Data on Distribution:

Central America

Guatemala: El Salto Escuintla, 1934, F. X. Williams.

Microvelia californiensis n. sp.

Size: Apterous male, 2.7-3.3 mm. long, 1.1-1.3 mm. wide; apterous female, 2.9-3.1 mm. long, 1.4-1.7 mm. wide.

Color: General ground color dark brown, protergum with transverse orange band, outer half of connexivum orange outlined with brown, legs smoky yellow to orange. Sides of protergum, abdominal tergites 2, 3, 5, 6, 7, and connexival segments 3, and 6 silvery. Venter silvery lead-blue to dull lead-blue.

Structural Characteristics: Antennae; indistinguishable from some other members of Group I,

Legs; fore femur of male swollen, not black with one or more short spines on ventral surface. Hind femur of male not swollen as much as front femur. Mid-tarsal segment 1 slightly shorter than hind tarsal segment 1. Apex of hind tibia with round brush-like comb. **Thorax;** protergum not covering any of mesotergum. **Abdomen;** last tergite of male wider than long. First genital segment with posteriorly pointing bristles (similar to **M. gerhardi** Hussey) on a slightly raised welt which is about half as prominent as that of the latter species Anal lid and hypandrium rounded, without lateral projections. Ventral surface of first genital segment concave.

Location of Types: Holotype and **Allotype,** apterous male and female, Lafayette, California, 7-14-33, R. H. Beamer; in Francis Huntington Snow Entomological Collection, University of Kansas.

Comparative Notes: Probably most closely allied to **M. gerhardi** Hussey, and resembles **M. irrasa** Drake and Harris in first genital segment and has a tendency toward hairiness but it is not nearly as large or so hairy as **M. irrasa.**

Data on Distribution:

California: Berkeley, 4-26-33, Jean Linsdale; Leona Heights, 7-15-33, R. H. Beamer; Leguna Mts., 7-6-29, R. H. Beamer; Lafayette, 7-14-33, R. H. Beamer; San Diego Co., 7-4-29, L. D. Anderson; Bakersfield. 7-24-29, R. H. Beamer; Gaviota, 7-19-33, R. H. Beamer.

Microvelia schmidti n. sp.

Size: Male, 3.6 mm. long, 1.1 mm. wide; female, 3.2 mm. long, 1.3 mm. wide.

Color: Ground color dark brown. Apterous protergum with transverse orange band. Abdomen covered uniformly with silvery white hairs. Connexivum with orange spot on each segment. Legs dark brown to black, except base of femora, trochanter, and coxa, which are yellow. Venter lead-blue. Wings dark brown with veins indistinct.

Structural Characteristics: Antennal formula—1: 2:3:4::35:43:53:38.

Legs: Hind femur of male with three to five spines on inner surface, front femur without spines. Femora swollen very little. Apices of front and hind tibiae, with small round brush of very short hairs on a pedicel about half as long as the width of the tibia or a little longer. **Tarsi:** Hind tarsal segment 1 decidedly longer than 2, ratio 1:2::10:8. Mid-tarsi, about equal, ratio 1:2::6:6. **Abdomen** Seventh tergite about as wide as long, length equal to length of fifth plus sixth tergite. **Genitalia:** First genital segment deeply sunken on ventral side nearest base, semi-circle of short hairs on ventral surface near posterior margin.

Location of Type: Holo and **Allotype,** winged male and female, Rio Virilla, Costa Rica, 12-26-31, Heinrich Schmidt; **Holo** and **Allomorphotype,** apterous male and female, San Jose, Costa Rica, 1932, Heinrich Schmidt. Several paratypes and paramorphotypes from the two localities above.

Comparative Notes: This is one of the very largest species in Group I. The spine-like brushes on the apices of the fore and hind tibiae of the male are unique. The short fourth segment of the antennae with its yellow base and dark apex is also sufficient to separate the females as well as the males from all other species.

Data on Distribution:

Central America

Costa Rica: San Jose, 1932, H. Schmidt; Rio Virilla, 12-26-31, H. Schmidt; Rio Torres, 2-10-32, H. Schmidt.

Microvelia hidalgoi n. sp.

Size: Length 2.3-2.5 mm., width .8—1 mm.

Color: Ground color brown. **Winged form;** protergum with transverse rusty-orange spot touching anterior margin. Humeral angles rusty-orange. Posterior margins of protergum light yellow, broken at middle, each yellow area arc-shaped with the chord being the posterior margin of the protergum. Wings light mottled brown, veins light tan, prominent, white spots in each cell. Legs yellow tinged with brown. Venter yellow with dark streak on sides. Silky pubescence covering venter. **Apterous form;** protergum with transverse spot as above. Abdomen rusty orange with sclerites outlined in brown. Venter and legs as above.

Structural Characteristics: Antennae formula—1: 2:3:4::10:9:14:17-20. Variation noted in the thickness of segment 3 and in the length of segment 4. **Legs;** no spines on legs of male or female. Femora about twice as thick as tibiae. **Tarsi;** Mid-tarsal segment 1: segment 2:: 12:11. Same true of hind tarsi. **Thorax;** protergum covering all of mesotergum and all of metatergum except lateral triangles (Group III). Length of apterous protergum: distance between eyes ::21:15. **Abdomen;** length of seventh tergite of male : width :: 12:14. Length of seventh tergite of male : fifth plus sixth :: 12:17. **Genitalia;** first genital segment short, rounded, posterior ventral margin evenly curved. Anal lid and hypandrium without lateral projections. Clasper bluntly triangular in outline, not twice as long as wide.

Location of Type: Allotype; Holotype; San Jose Costa Rica, Heinrich Schmidt, 1932. **Holomorphotype, Allomorphotype,** Rio Virilla, Costa Rica, 12, 26, 31. Heinrich Schmidt, in Francis Huntington Snow Entomological collection, University of Kansas.

Comparative Notes: According to apterous protergum this species is most closely related to **M. fontinalis** Bueno, **M. cerifera** n. sp., and **M. williamsi** n. sp. It is more elongate than **M. fontinalis** Bueno, **M. cerifera** n. sp. or **M. rufescens Champ.** There is nothing particularly unique about this species except the coloration of the wings and protergum.

Data on Distribution:

Central America

Costa Rica: Rio Virilla, 12-26-31, Heinrich Schmidt; San Jose, 1932, Heinrich Schmidt.

NEW SPECIES OF STONEFLIES (PLECOPTERA)

P. W. CLAASSEN, Cornell University

Herewith are described nine new species of North American Plecoptera. Included also is a description of the male of **Perla nona** Needham and Claassen which was unknown at the time when this species was first described. A discussion is also included on the synonomy of **Nemoura stigmata** Banks and **Megaleuctra spectabilis** Neave. While I have not thrown the generic name **Megaleuctra** Neave into synonomy with **Udamocercia** Enderlein I think that perhaps they are synonomous. Until the genotype of **Udamocercia** can be more carefully studied it is perhaps desirable to retain the name **Megaleuctra**.

Acroneuria delta, new species

Plate 1, figure 1

Length to tip of wings, female, 31 mm.

General color dark brown. Head with a lighter spot in the ocellar triangle and lighter outside of the hind ocelli; hind ocelli nearly twice as close to each other as to the eyes. Pronotum narrower than head, narrowed behind; median field about one-sixth the width of pronotum; discs moderately rugose; general color brown but with the front and lateral margins yellowish. Wings lightly fumose; Sc ends slightly beyond the cord; field beyond the cord with about 10 crossveins in forewing. Abdomen yellowish; cerci somewhat darkened toward the tip.

Female. Subgenital plate of eighth abdomen sternite slightly produced and notched in the middle as shown in figure.

Male. Unknown.

Holotype, female, Yellowstone River, Wyoming, August 5, 1921, F. M. Sales (Cornell Entomological Collection).

Paratypes, one female, Sinks Canyon, Wyoming, June 6, 1934, P. Schulthess. This female is generally a little lighter in color but structurally agrees with the above description.

Acroneuria prolonga, new species

Plate 1, figure 4

Length to tip of wings, female, 25 mm.

General color dark brown, head a little wider than pronotum, yellowish behind and with a dark area over the ocellar triangle. The hind ocelli a little closer to each other than to the eyes.

Pronotum almost uniformly brown, narrowed behind, angles quite sharp, and the surface rather rugose. In both the fore and hind wings there are two or three cross veins beyond the cord.

Female. Eighth abdominal sternite produced into a broadly rounded subgenital plate which is narrowed at the base and extends almost across the entire ninth sternite.

Male. Unknown.

Holotype, female, Bridger Mountains, Montana, June 19, 1914. (Cornell Entomological Collection). This species most nearly approaches **Acroneuria arida** Hagen, but differs both in venation and in the structure of the subgenital plate.

Nemoura complexa, new species

Plate 1, figures 2, 3, 6.

Length to tip of wings, male, 7 mm.

General color reddish brown with uniformly lightly infuscated wings and with the veins of the pterostigma much darker than the rest of the veins.

Head much wider than pronotum, in fact the pronotum is not as wide as the distance across the occiput of the head; ocelli about twice as close to eyes as to each other. Both head and pronotum mottled with darker brown. Cervical gills absent. Hind wings with a narrow anal area.

Male. Abdominal segments one to eight largely membraneous and only sclerotized along the dorsal anterior margins; segments nine and ten heavily sclerotized. Cerci long, incurved, fully sclerotized and on the inside near the tip with a tooth. Supraanal process upcurved, enlarged and of complex structure, consisting of two median sclerotized bars flanked with a bulbous lobe bearing near the tip 3 or 4 spines and at the base on each side with about 6 large spines directed outward; anteriorly there projects a 3-pronged semi-membraneous process from about the middle of the supra-anal lobe Subanal lobes narrow at base, flattened and much enlarged toward the tip and outwardly sharply pointed. Sub-

genital plate long, slender and bifurcate at the tip; ventral lobe narrow and about 2½ times as long as wide.

Female. Unknown.

Holotype, male, Artists Brook, Essex County, New York, June 11, 1933, C. R. Crosby and H. Deitrich (Cornell Entomological Collection).

Paratypes. One male, same locality June 28; one male, Chapel Pond, Essex County, New York, June 27; one male, Slaterville, New York, May 30.

This species most nearly approaches **Nemoura serrata** Claassen but differs greatly in details of the genital structures.

Leuctra sara, new species
Plate 1, figures 7, 8, 11.

Length to tip of wings; male, 7½—8 mm.; female, 9 mm.

General color dark brown to blackish. This species resembles **P. occidentalis** Banks, but differs from this species as follows:

Male. The cerci are modified into heavily sclerotized processes possessing five prongs, a small one directed inward at the base and each of the two other prongs with a shorter prong on the inside. The supra-anal process is narrower than that of **occidentalis** and possesses an upcurved slender prolongation at the tip. The ventral lobe is a little wider than in **occidentalis;** the subgenital plate is a little more prolonged and almost truncate at the tip, with just a suggestion of emargination at the center.

Female. The eighth abdominal sternite is produced into a bilobed, widely emarginate subgenital plate, whose lobes bear long hairs. In general there is very little difference between the subgenital plate of this species and **occidentalis** except that the emargination in this species is not as great as it is in **occidentalis.**

Holotype, male; allotype, female; Ringwood Lloyd Preserve, near Ithaca, N. Y., May 10, 1927. (Cornell Entomological Collection)

Paratypes. Two males, same locality; six males, 1 female, Copala Falls, N. Y., April 11, 1924, Crosby and Chapman; one male, E. Jewett, Catskill Mts., N. Y., April 18, 1913; two males Ithaca, N. Y., April 18, 1928.

Leuctra crosbyi, new species
Plate 1, figure 10.

Length to tip of wings, male, 8 mm.

General color reddish brown. Head very slightly wider than pronotum; a narrow dark line connecting the hind ocelli. Pronotum hardly wider than long, narrowed behind; median longitudinal field about one-fourth as wide as pronotum. Wings reddish fumose.

Male. Seventh abdominal tergite medially prolonged into a spatulate-shaped sclerotized process which extends partly onto tergite eight and with a shorter narrow sclerotized process on each side; subanal lobes broad; tittilators shorter than subanal lobes, slender and curved forward; ventral lobe about as wide as long.

Female. Unknown.

Holotype, male, Mt. Pisgah, Frying Pan Gap, N. C., October 15, 1926, C. R. Crosby (Cornell Entomological Collection).

This species most nearly approaches **L. triloba** Claassen but is larger in size and is easily recognized by the process on the seventh abdominal tergite.

Leuctra bilobata, new species
Plate 1, figure 9.

Length to tip of wings, female, 7 mm.

General color reddish brown. Head a little wider than pronotum; smooth over ocellar triangle but rugose back of ocelli. Pronotum slightly narrowed behind. Wings reddish fumose.

Female. Eighth abdominal sternite prolonged into a bilobed subgenital plate which reaches entirely across the ninth sternite.

Male. Unknown.

Holotype, female, Selkirk Mts., British Columbia, July 18, J. C. Bradley, (Cornell Entomological Collection).

Paratype, female, Rogers Pass, Selkirk Mts., August 1, 1908, J. C. Bradley.

This species is similar to **L. occidentalis** Banks, but the subgenital plate is so different in both of these females that I believe it to be a distinct species.

Taeniopteryx raynoria, new species
Plate 1, figure 13

Length to tip of wings, male, 13 mm.; female, 14 mm.

General color reddish brown with moderately fumose wings but with an irregular clear band across the forewing in the area of the cord.

Head a little wider than pronotum; a lighter spot in the ocellar triangle and lighter inside the eyes; occiput rugulose. In general appearance similar to **Taeniopteryx pacifica** Banks, but differing in the genital structures.

Male. Supra-anal process directed upwards, curved rearwards, sharply pointed and bearing posteriorly a bulbous knob at the tip of which projects a small finger-like process; at the base of each cercus an inward directed process, rounded at the tip and well sclerotized; subanal lobes asymmetrical and consisting of variously modified membraneous structures; tenth tergite bears very large sclerotized processes as indicated in the illustration; subgenital plate extends considerably beyond the tip of the tenth segment, and there is no ventral lobe. The cerci are composed of eight segments.

Female. The genital structures of the female are very similar to **Taeniopteryx pacifica** Banks, except that the plate of the ninth abdominal sternite is more broadly rounded.

Holotype, male, allotype, female, Yosemite, California, June 1, 1936, H. J. Raynor (Cornell Entomological Collection).

Allotype, one female, same locality.

Taeniopteryx vanduzeea, new species
Plate 1, figure 12

Length to tip of wings, male, 8 mm.

General color dark brown with lightly infuscated wings.

Head rather uniformly brown and smooth except for slight rugosities on the occiput; hind ocelli much closer to eyes than to each other. Pronotum widened behind and with moderately rugose discs. Wings with a slanting cross vein beyond the cord between costa and subcosta. Coxae without gill scars.

Male. Supra-anal process broad, flattened, directed upward and slightly recurved, heavily sclerotized and quite broadly rounded at the tip; back of supra-anal process and attached to its base are two membraneous bulbs, the first one reaches almost to the tip of the supra-anal process and is smaller than the second one which, under high magnification, shows it to be finely spinulose; subanal lobes asymmetrical and each composed of three variously modified membraneous processes which recurve upward; cerci six-segmented; at the base of each cercus a large inward and anterior-ward directed sclerotized process; tenth tergite bears no appendages but each side is elevated into smooth knobs. Subgenital plate greatly produced and at the base with a ventral appendage which is about as wide as long.

Holotype, male, G. Alpine Cr., Tahoe, California, E. P. VanDuzee, (Cornell Entomological Collection). This species differs from other western species of this genus in possessing a ventral appendage on the ninth sternite of the male as well as in details of genital structures.

Megaleuctra stigmata Banks

1900 **Nemoura stigmata** Banks, Trans. Am. Ent. Soc. 26:244.

1930 **Megaleuctra spectabilis** Neave, Can. Ent., 46:4.

A study of the male type of **Nemoura stigmata** Banks shows that it is identical with **Megaleuctra spectabilis** Neave which was described from female specimens. A comparison of the wing venation has revealed the identity of these two species. Bank's type was collected in Winnipeg, B. C., June 17 and Neave's specimens were collected May 29, and June 18, Purcell Range, B. C. I also possess a female of this species from Alberta, B. C., bearing the date June 1, 1927.

In 1905 Enderlein, Zool. Anz. 28:814, described as a new species **Leuctra antarctica** End., a female from Antarctic South America (Feuerland). This female has the eighth abdominal sternite produced into a long process very similar to **Megaleuctra stigmata** Banks, but Enderlein's drawing and description does not show a second process of sternite nine. It is possible that in a dry specimen the details of the genitalia were not clearly seen.

In 1909 Enderlein, Zool. Anz. 34:394 erected the genus **Udamocercia** with **Leuctra antarctica** Enderlein the genotype. In 1912 Enderlein, Kungl. Sv. Vet. Akademiens Handlingar 48, No. 3, plate 4, fig. 43, illustrates the wings of **Udamocercia antarctica** Enderlein. The venation is similar to that of **Megaleuctra stigmata** Banks and both fore and hind wings possess the clouded spot in the pterostigma.

After a careful study of the above situation I am inclined to believe that **Megaleuctra** Neave is a synonym of **Udamocercia** Enderlein.

Megaleuctra complicata, new species
Plate 1, figure 15

Length to tip of wing, male, 16 mm.

General color dark brown with infuscated wings whose veins are dark and with a dark brown spot in the pterostigma beyond the end of Sc. This spot is present in both fore and hind wings.

In general it agrees quite well with **Megaleuctra stigmata** Banks but it differs in genital structures and in details of wing venation. Neave's figure of **spectabilis** Neaves equals **stigmata** Banks shows at the origin of Rs in the forewing a small stub of a cross vein. This stub is present also in the male type **stigmata** as well as in a female of stigmata which I possess from Alberta, B. C. While the presence of this stub may not be of significance it is worthy to note that in this new species it is absent. However the structural differences in genitalia have led me to describe this as a new species.

Male. The first eight abdominal segments are normal, moderately and evenly sclerotized; on the 9th tergite there are two knobs which are narrower than in **stigmata** Banks. The ninth sternite bears a subgenital plate which is produced into a rather narrow process and extends to the base of the upturned probe. At the base of the ninth sternite originates a very large ventral appendage which is membraneous below and heavily sclerotized above. Tenth tergite cleft and bearing at the posterior margin two sclerotized lobes which extend forward over the cleft. Supra-anal process largely membraneous except at the tip where it bears a downward pointing lightly sclerotized process. The supra-anal lobe is guarded on each side by a heavily sclerotized flattened

process which originates at the base of the cerci and apparently is homologous to the small inward pointing processes which occur in some of the species of **Nemoura.** Posteriorly at the base of the supra-anal process there are two membraneous lobes which, when fully extended, are at least half as long as the cerci. The basal portion of the tenth tergite or perhaps the subanal lobes have been fused into an upcurved probe which is heavily sclerotized on the inside and surrounded by a membraneous sheath; the tip is bifurcate. Cerci long, slender, moderately sclerotized and covered with rather long hairs.

Holotype, male, Corvallis, Oregon, March 28, 1930, Ruth J. Norberg (Cornell Entomological Collection). When I studied the type of **Nemoura stigmata** Banks, the specimen was not relaxed and consequently the full details of the genitalia could not be studied. However, I believe that this species is distinct from **stigmata** and I base this on the fact that the lobes on the ninth tergite are smaller, the genitalia different, and on the fact that this new species was collected in March, whereas the specimens of **spectabilis** Neave equals **stigmata** Banks were collected in May and June.

Perla nona, Needham & Claassen
Plate 1, figures 5, 14.

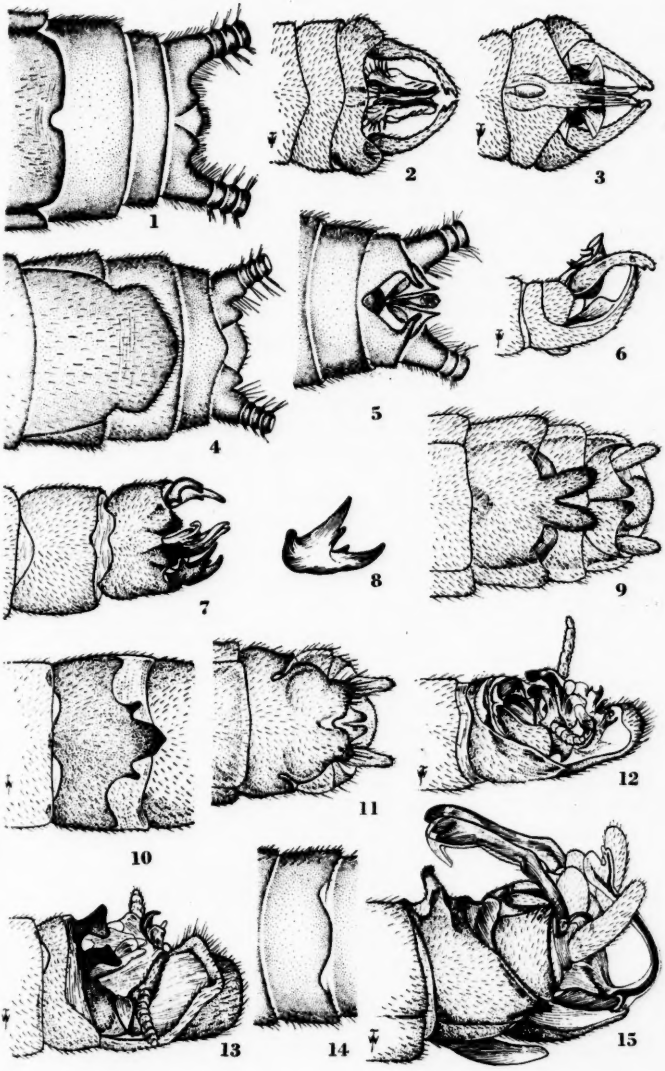
The original description of this species was based upon a single female specimen from Oregon. Recently I have received a female and two males of this species from Professor Dimick in Oregon, and I am herewith describing the male and including figures of the male genitalia.

Male. Length to tip of wings, 16—17mm. The general coloration of the head and the pronotum agree with the original description of the species. The seventh abdominal sternite is slightly produced rearward suggestive of a transverse lobe; ninth sternite slightly produced and broadly rounded; tenth tergite cleft and with finger-like processes directed inward. Supra-anal process bluntly pointed and not greatly sclerotized. The subanal lobes quite sharply pointed and somewhat directed backward.

Two females, one male, Metolius River, Oregon, September 24, 1932, R. E. Dimick.

Explanation of Plate

Fig. 1. Acroneuria delta new species, female.
Fig. 2. Nemoura complexa new species, dorsal view.
Fig. 3. Nemoura complexa new species, ventral view.
Fig. 4. Acroneuria prolonga new species, female.
Fig. 5. Perla nona Needham & Claassen, male.
Fig. 6. Nemoura complexa new species, male, side view.
Fig. 7. Leuctra sara new species, male.
Fig. 8. Leuctra sara new species, cercus of male.
Fig. 9. Leuctra bilobata new species, female.
Fig. 10. Leuctra crosbyi new species, male.
Fig. 11. Leuctra sara new species, female.
Fig. 12. Taeniopteryx vanduzeea new species, male.
Fig. 13. Taeniopteryx raynoria new species, male.
Fig. 14. Perla nona Needham & Claassen, male, showing 8th abdominal sternite.
Fig. 15. Megaleuctra complicata new species, male.


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

NOTES ON THE LIFE HISTORY OF THE BRONZED CUTWORM (1) IN KANSAS

H. H. WALKDEN, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.

INTRODUCTION

The bronzed cutworm is a pest of minor importance on cereal and forage crops in the Eastern Great Plains region. Normally the species is uncommon but occasionally favorable conditions permit its increase to a point where grasslands, especially bluegrass areas, suffer moderate damage by larval feeding. For this reason it seems well to publish the results of observations made in Kansas during the past few years.

DISTRIBUTION AND ECONOMIC IMPORTANCE

This species is recorded as occurring throughout the northern part of the United States east of the Rocky Mountains, with Colorado, Kansas, Missouri, Tennessee, and Virginia as the approximate southern limit of its range. It also occurs in injurious abundance in eastern Canada, particularly New Brunswick (5). In Kansas the writer has taken adults at Cherryvale, Wichita, Manhattan, Hays, and Garden City; in Nebraska, at Lincoln, and also at Scottsbluff in the extreme western part of that State.

A review of the published records on the bronzed cutworm reveals that it has been recognized for many years as an injurious species, particularly in the Northeastern States and in eastern Canada. In 1888, Lintner (7) mentions it as attacking corn. Forbes (3) records much damage to grass in New York in 1881, and states that about 3,000 acres of meadow and pasture were destroyed near Columbus, Ohio, in 1886. Gossard (6) lists the bronzed cutworm among the most common and destructive cut-worms in Ohio. In Iowa (2) it is recorded as having been unusually abundant in pastures during 1926 and 1927.

HOST PLANTS

The larvae have a very pronounced preference for

(1) Nephelodes emmedonia Cram. Order Lepidoptera, family Noctuidae.

bluegrass and have been recorded in the literature (**1, 2, 3, 4, 5, 7**) as grass and cereal plant feeders. They have also been known to climb fruit trees and attack the buds and leaves. The writer has taken the larvae from the crowns of bluegrass (**Poa** sp.) and wild rye (**Elymus virginicus** L.), and also from under sacks placed in grassy alfalfa fields.

For detailed descriptions of the egg, larval, and pupal stages the reader is referred to Crumb (**1**).

SEASONAL HISTORY

In Kansas there is but one generation of the bronzed cutworm annually. In this respect its seasonal history is similar to that exhibited by this species in the northern part of its range. As pointed out by Crumb (**1**), however, the higher average temperatures encountered in more southern latitudes tend to shorten the time necessary for the completion of the development and in order that the seasonal cycle occupy a full year there must therefore be a quiescent period in one or more of the stages. In the bronzed cutworm this period of retarded development occurs in the egg and larval stages.

The following discussion of the seasonal history of the species is based on observations made in the vicinities of Wichita and Manhattan, Kans.

The adults make their appearance about mid-September, and the flight continues into the early part of October, the greatest number of adults being present during the first week of that month. The eggs are deposited shortly after the emergence of the females, but do not hatch until the following January and February. In the insectary, eggs deposited in the first week of October hatched during the last of January and the first half of February. The larvae become full grown by the last of April. During the first ten days of May the majority cease feeding and form their earthen pupal cells. A few stragglers continue feeding until the last of May. After the formation of the pupal cells the larvae remain

quiescent during the summer months, pupation beginning about August 15. The pupal period occupies about four weeks and the seasonal cycle is completed with the emergence of the adults in September and early in October. The seasonal history is shown graphically in figure 1.

LIFE CYCLE

The Adult

Although the adults may be taken over a period of about 4 weeks during September and October, it is quite probable that the average length of their life is about 2 weeks. Individuals emerging from the life-cycle series lived a maximum of 16 days, and a minimum of 3 days. In cages, oviposition began 2 days after emergence, the eggs being scattered promiscuously among the soil particles at the bottom of the cage. The females showed no disposition to place their eggs in masses, or on the foliage of stems of the alfalfa in the cages. One female deposited 117 infertile eggs before death and on dissection the ovaries were found to contain 393 eggs. Another female deposited 361 fertile eggs but the eggs remaining in the ovaries after death were not counted.

In order to obtain information on the fecundity of the species, 16 freshly emerged females were dissected and the eggs contained in the ovaries were counted. The maximum number of eggs observed was 1,381 and the minimum 533, the average for the group being 1,071.

In the reared specimens, the number of males exceeded that of the females. Of 92 adults secured in various rearings, 58 percent were males. At the bait and light traps, scarcely any females were taken. The sex was observed in 253 adults from the bait trap and the ratio was 1 female to 20 males.

The Egg

Under outdoor insectary conditions, the incubation period of the eggs averaged approximately 127 days. (Table 1.)

TABLE 1.—Summary of life cycle of the bronzed cutworm in Kansas

Stage	Specimens Observed	Maximum	Minimum	Average
	Number	Days	Days	Days
Egg	361	145	98	126.8
Larval				
First instar	255	48	21	30.0
Second instar	252	15	5	10.5
Third instar	245	14	4	9.0
Fourth instar	244	13	3	8.2
Fifth instar	239	20	5	13.5
Sixth instar — Larvae having only six instars	116	171	138	158.3
Sixth instar — Larvae having seven instars	68	19	7	15.6
Seventh instar	27	169	63	147.3
Total larval	143	248	147	230.8
Pupal	69	34	24	27.6
Egg to adult	69	397	305	381.0

It was found that eggs deposited on the same date varied considerably in their incubation period. For example, one lot of eggs deposited September 28, 1927, began hatching on January 18, 1928, and the last larva appeared February 20. Other lots of eggs deposited on September 30, October 3, and October 6 showed a similar variation. The hatching period for the 361 eggs under observation extended from January 12 to February 25. Slightly more than 75 percent of the eggs hatched during the period January 30 to February 8.

The Larva

In making observations on the larval instars, the

procedure was as follows:

The eggs were kept in an outdoor insectary during the winter months, and as the larvae emerged they were placed in homeopathic vials, one larva per vial, with leaves of bluegrass supplied for food. The vials were plugged with cotton and put in holes bored in plaster of paris blocks, the plugged end in contact with the plaster. A supply of moisture was introduced by absorption from the plaster, which was kept saturated with water. In this way the food was kept in good condition for at least 24 hours. The larvae were observed daily and the molts recorded. The food supply was replenished when necessary. After the third molt the larvae were transferred to 3-ounce salve tins partially filled with sterilized soil. The food, consisting of bluegrass leaves, was placed on top of the soil.

The larvae were kept in the insectary until April 17, when they were placed in a cave. On June 16 they were removed to the laboratory basement, where they remained until the emergence of the adults in September and October.

The first instar is rather prolonged, owing to the fact that the eggs hatch at a time of the year (the early part of February) characterized by alternating warm and cold periods. The later instars, which occur during March and April, are much shorter, the exception being the final instar which carries the species through the summer months in a quiescent state.

By May 15 practically all of the larvae had ceased feeding and had constructed their pupal cells.

As the larvae molted, the cast head capsules were measured, the greatest width as seen from the front being taken. A summary of the head measurements is given in table 2.

TABLE 2—Summary of measurements of width of head capsule in the different instars of the larvae of the bronzed cutworm.

Instar	Maximum Width	Minimum Width	Average Width	Heads Measured
	Mm.	Mm.	Mm.	Number
First	0.60	0.50	0.56	255
Second	1.00	.80	.88	250
Third	1.55	1.20	1.38	239
Fourth	2.40	1.90	2.18	240
Fifth — Larvae having only six instars	3.90	3.00	3.44	170
Fifth — Larvae having seven instars	3.30	2.60	2.90	66
Sixth — Larvae having seven instars	4.30	3.60	4.06	67
Final instar (a)	—	—	—	—

(a) No measurements of the final instar were made owing to the fact that in the final larval molt the head capsule splits, and no accurate measurements were possible.

The Pupa

Pupation takes place in the soil in an earthen cell. In the life-cycle series, pupation was about 2 weeks later than for larvae collected in the field. As a result, the average period from egg to adult was extended to 381 days, as shown in table 1. The final larval instar for specimens reared from eggs averaged 147.3 days, while for larvae collected in the field this instar averaged 135.0 days. The pupal period for field-collected larvae averaged 2.1 days less than for the group reared from the egg. The reason for these differences is not clear.

Measurements taken of 83 pupae showed the average length to be 27.4 mm. and the average breadth 8.8 mm. The pupae ranged in length from 24 to 33 mm. and in breadth from 8.0 to 11.0 mm.

LARVAL HABITAT, PARASITES AND DISEASE

A total of 169 larvae were collected on various dates

while these studies were in progress. The majority were taken in April, from their hiding places in clumps of bluegrass. In making these collections the writer was impressed by the remarkable protective coloration of the larvae. Removed from its natural habitat, the larva is very conspicuous, its pale longitudinal stripes being in sharp contrast with the bronzed, dark brown body color. Stretched out among the stems and dead leaves at the base of bluegrass clumps, the larva blends admirably with its surroundings.

Evidently the larval habit of hiding deep in bluegrass crowns protects the species from parasitic attack, since only 1 percent of the larvae taken were parasitized. These were parasitized by undetermined Hymenoptera, no adults of which were secured.

However, the species is subject to a devastating wilt disease, and 32 percent of the larvae under observation died from this malady. In addition, 1 percent of the larvae succumbed to an undetermined fungous disease.

Muesebeck (8) records **Apanteles rufocoxalis** Riley as a parasite of **N. emmedonia** form **violans** Guen.

Literature Cited

(1) Crumb, S. E.
1926. The Bronzed Cutworm.
Ent. Soc. Wash. Proc. 28 (9): 201-207.

(2) Curtiss, C. F.
1928. Iowa Expt. Sta. Rept. for 1927, p. 35.

(3) Forbes, S. A.
1904. The More Important Insect Injuries to Indian Corn.
Ill. Agr. Expt. Sta. Bull. 95, pp. 359-361.

(4) Garman, H.
1895. Cutworms in Kentucky.
Ky. Agri. Expt. Sta. Bull. 58, p. 101.

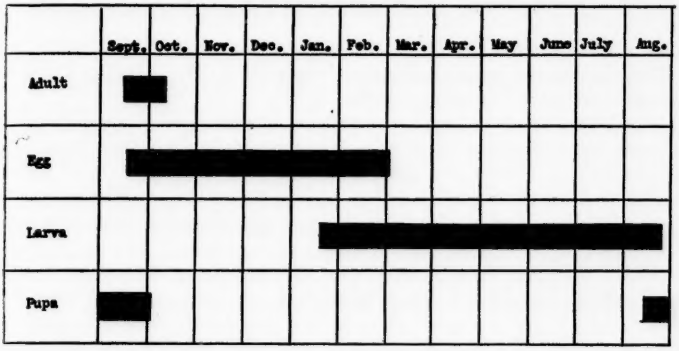
(5) Gibson, A.
1915. Cutworms and Their Control.
Canada Dept. Agric. Ent. Bull. 10, p. 28.

(6) Gossard, H. A.
1917. Ohio Agr. Expt. Sta. Monthly Bull. II (3) pp. 85-90.

(7) Lintner, J. A.
1888. Cutworms.
N. Y. State Mus. Bull. 6, p. 11.

(8) Muesebeck, C. F. W.
1920. Revision of the North American Species of the Genus Apanteles. U. S. Nat. Mus. Proc. 58: 544.

Figure 1—Seasonal History of Bronzed Cutworm in Kansas.



NOTES ON HEBECEPHALUS WITH THREE NEW SPECIES. (HOMOPTERA-CICADELLIDAE)

R. H. BEAMER, Lawrence, Kansas*

Hebecephalus blandus (Gill.)

Deltocephalus blandus Gillette, C. P., Colorado State Agri. Exp. Sta., Bull. 43, p. 26, 1898.

This species was described from two females, one from Ft. Collins, and one from Calhan, Colorado. It is seemingly a rare form in its type locality and was only rediscovered in numbers in 1935 by P. W. Oman near Santa Fe, New Mexico, and again in 1936 by myself at Las Vegas, New Mexico, St. Johns and Flagstaff, Arizona.

The male is like the female in form and color but much smaller in size and has the elytra as long as the abdomen. Length 1.75 mm.

Genitalia: Valve more than twice as long as last ventral segment, angular; plates as wide at base as valve, at least twice as long, gradually narrowing to rounded apices. Pygofer long, without hooks. Styles almost as long as plates, slender on outer two-thirds. Aedeagus of medium length, in dorsoventral view with two pairs of lateral processes, one apical giving the apex a triangular appearance and the other near middle retrorse. Neither pair more than about half as long as width of shaft.

*Contribution from Department of Entomology, University of Kans.

The male, Las Vegas, New Mexico, July 13, 1936, R. H. Beamer, described above, is designated allotype.

Hebecephalus neomexicanus Tuthill

Hebecephalus neomexicanus Tuthill, L. D., Jour. Kans. Ent. Soc., vol. 3, p. 44, 1930.

This species was described from a single female from Belen, New Mexico. The male is like the female except the elytra are longer than the abdomen and the size is slightly smaller.

Male genitalia: Valve angular, broader than long; plates not as broad at base as valve, roundingly narrowed to slightly concave margins near middle, apices rounded, mesal margins diverging on outer half. Outer half of styles more or less avicephaliform, inner margin of apex much longer than outer. Aedeagus in dorsoventral view short, apex rounded with a pair of lateral retrorse processes diverging from shaft, a second pair of retrorse processes near middle of ventral margin of shaft about one fourth as long as anterior pair. Shaft in lateral view almost as broad as long. Pygofer normal without hooks.

Allotype male and 33 parallotypes from type locality, Belen, New Mexico, July 20, 1936, R. H. Beamer. The above males with nine females were taken from a short grass in the pasture from which the type female was caught.

Hebecephalus subitus n. sp.

Resembling **H. neomexicanus** Tuthill but apex of male style not avicephaliform and last ventral segment of female with a median tooth on posterior margin instead of a notch. Length, female 1.75 mm, male, 1.5 mm.

Color: Cinereous marked with fuscous. Vertex with characteristic pair of longitudinal parallel chain markings, basally with light, converging inclusions. Veins of elytra light more or less evenly bordered with fuscous. Venter mottled with fuscous.

Genitalia: Last ventral segment of female with lateral margins rounded, posterior margin shallowly excavated with median tooth on either side of which is a small notch. Male pygofer long without hooks. Valve angular; plates as wide at base as valve, suddenly narrowing on outer third to rounded apices, mesal margins sharply diverging on outer fourth. Style slender on outer third, not avicephaliform. Aedeagus in dorsoventral

view short with a pair of diverging, retrorse processes almost half as long as shaft. Another retrorse, ventral process on shaft back from apex, possibly one fourth as long as apicals, slightly bifid.

Holotype male, allotype female, Roswell, New Mexico, July 16, 1936, R. H. Beamer. In Snow Entomological Collection.

Hebecephalus merus n. sp.

Resembling **H. neomexicanus** Tuthill but distinctly smaller in size, last ventral segment of female with posterior margin convex instead of concave, male plates with apices truncate instead of rounded and four processes of aedeagus of about equal length. Length, female 2.75 mm., male 2.5 mm.

Vertex distinctly longer than width between eyes, apex sharp, less than a right angle. Elytra longer than abdomen in female, shorter in male.

Color: Cinereous throughout, marked with fuscous. Vertex with pair of comma-shaped marks either side of apex, most of disc covered by chain-like longitudinal stripes, one either side the middle. Pronotum with three pairs of more or less definite longitudinal stripes. Elytra with veins white, more or less regularly bordered with fuscous.

Genitalia: Female last ventral segment with lateral angles rounded, posterior margin with median two thirds produced and dark-colored. Male valve obtusely angular; plates about as wide at base as valve, roundingly narrowed to truncate apices. Aedeagus in dorsoventral view with a pair of retrorse, diverging apical processes, about two-thirds as long as shaft, a second retrorse pair arising on ventral margin just before tip, paralleling shaft, about as long as apicals. Styles with more or less truncate, avicephaliform apices. Pygofer normal without hooks.

Holotype male, allotype female and one male paratype,type, Faraway Ranch, Arizona, August 24, 1935, R. H. Beamer. In Snow Entomological Collection.

Hebecephalus funestus n. sp.

Resembling **H. subitus** Beamer but female with last ventral segment much longer, median tooth less acute, male plates with lateral margins evenly curved instead of abruptly narrowed on outer third, apical third of style broader and more truncate at apex and aedeagus

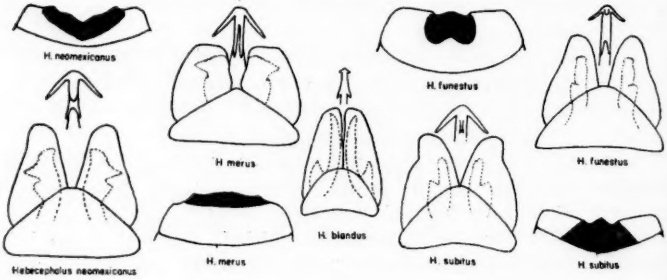
with anterior processes much shorter and narrower than posterior pair.

Vertex acute, less than a right angle, almost a third longer than width between eyes. Elytra shorter than abdomen in female, longer in male. Length, female 3 mm., male 2.25 mm.

Color: Cinereous marked with fuscous. Vertex with pair of diverging dashes at apex, sometimes connected with longitudinal chain marks. Disc of vertex mostly occupied by a pair of chain-like longitudinal marks with oblong light inclusion at their base. Pronotum with a semblance of six longitudinal stripes. Veins of elytra white, fairly regularly bordered with fuscous.

Genitalia: Female last ventral segment twice as long as penultimate, lateral angles broadly rounded, posterior margin slightly excavated to a broad, shallow, median notch which in turn has a broad slightly extended median prominence. Valve of male angular; plates about as broad at base as valve, lateral margins sinuately narrowed to bluntly rounded apices; styles abruptly narrowed on outer third to about two-thirds their width, almost parellel sided to blunt apices; aedeagus in dorsoventral view with two pairs of processes, anterior pair retrorse, about twice as long as width of shaft and diverging from it at about a 45 degree angle, posterior pair arising on ventral side of shaft just back of canal opening, running parallel with shaft for about two thirds its length, diverging from the shaft on their outer third and from each other on their outer fourth, much heavier and at least twice as long as anterior pair.

Holotype male, allotype female, 11 male and 10 female paratypes, Grady, New Mexico, July 16, 1936. R. H. Beamer. Types in Snow Entomological Collection.



A NEW POTAMOBATES FROM MEXICO (HEMIPTERA-GERRIDAE)

H. B. HUNGERFORD, Lawrence, Kansas*

In 1898 Champion described **Potamobates bidentatus** (1) and this remained for thirty years the only known Mexican species. In 1928 Drake and Harris described a species from Montzoranog, Vera Cruz, which they named **P. osborni.(2)** During the past summer Mr. Henry D. Thomas collected a third species in Mexico which is new to science.

Potamobates thomasi n. sp.

Size: Length of winged forms, both sexes, 14 33 mm.; length of wingless forms, both sexes, 13.3 mm. The females a little plumper than the males and both sexes displaying the same small variations above and below the measurements given.

Color: Body black above with shining metallic lustre. The apterous forms conspicuously striped with light brown or old ivory. Venter pale. Head black above with broad longitudinal light brown stripe between the eyes, this stripe somewhat constricted before the middle and shallowly to deeply concave on its anterior end; antennae and two distal segments of beak black; in the winged forms the anterior lobe of pronotum is marked by a light brown median longitudinal stripe and the posterior lobe is margined on sides and distal end by a band of same color, hemelytra dark brown with darker veins. In the wingless forms there is a median longitudinal light brown band on the pro, meso and metanotum followed by a row of linear spots on abdominal tergites to and including basal half of first genital segment. The mesonotum has an additional band on either side of the median one and the connexivum is margined with a continuous band of the same light color. The sides of the thorax and abdomen are covered with a silvery pubescense over black. Underside of head, thorax, abdomen, acetabula, coxae and trochanters old ivory, except for a black longitudinal streak on mesoacetabula. Legs black except anterior femora which are ivory above with a longitudinal black stripe and the under side of basal half of meso femora may be ivory to brown.

*Contribution from the Department of Entomology, University of Kansas.

Structural Characteristics: Antennal formula of male holotype: 1st: 2nd: 3rd: 4th:: 15: 5.5 : 4.3 : 5; of allotype 14.3 : 5 : 3.7: 5.1. The first antennal segment distinctly longer than width of head through the eyes. Pronotum of wingless male shorter than the head. Posterior lobe of pronotum in winged form without median longitudinal carina, except faintly on anterior half. Mesonotum of wingless male a little less than three times as long as the pronotum measured on dorsal line. Front femora, more or less cylindrical, less incrassate than in some species and provided, ventrally near distal end with a peg-like elevation. Front tarsus about one-fourth length of tibia. First tarsal segment about one-third as long as the second. Formula for intermediate leg of male:—femur: tibia : tarsus: : 20 : 12.5 : 9. First tarsal segment: second: : 7:2. Formula for posterior leg of male:—femur: tibia: tarsus:: 20.6 : 13 : 2.6. The last abdominal tergite of the male slightly longer than the one in front of it. The connexivum of the male bluntly produced behind. The connexivum of the female produced into a sharp pointed process covering two-thirds of the first genital. The connexiva of the wingless females are erect and converge caudally, their sharp pointed tips nearly continguous. The first genital segment of the male measured on the median dorsal line no longer than the last abdominal tergite, the second genital a little shorter, its basal part produced ventrally on the left side and ending in a triangular tooth or process. In the male the caudal margin of the last ventral abdominal segment is doubly emarginate. The first genital neither longitudinally grooved beneath nor modified on its posterior margin.

In the female the genital segments are symetrical, but the rear margin of the last ventral abdominal segment is produced into two stout processes, one at each caudo-ventral angle.

Location of types: Holotype, allotype, holomorphotype, allomorphotype and nine paratypes in the Frances Huntington Snow Entomological Museum, University of Kansas.

This species described from three winged specimens (one male and two females) and ten wingless specimens (five males and five females) labeled "El Sabino, Uruapan, Michoacan, Mexico, July 25, 1936. H. D. Thomas."

Comparative notes: This interesting species, while having the general facies of Potamobates and running without question to this genus by the Drake and Harris (3) key on pages 181-182 of their "Gerrinae of the Western Hemisphere" nevertheless has a closer affinity to Cylindrostethus Fieb. than any other new world species of Potamobates known to date. Its relation to Cylindrostethus is shown by the more elongate and more evenly segmented abdomen and by the relatively much smaller genital segments in the male. Its general color pattern, its longer beak, its broad somewhat flattened mesothorax, its middle and hind femora surpassing the abdomen by half their length and the asymentrical structure of the second genital segment of the male are typically Potamobates in character. **Potamobates thomasi** while the largest species so far described appears to be more nearly related to **Potamobates horvathi** Esaki and **Potamobates unidentata** Champion than to any of the others, but unlike them in lacking a projection from the rear margin of the first genital segment of the male.

Literature Cited:

1. Champion. Biol. Centr.-Amer. Rhynch. II, pp. 155-156, 1898.
2. Drake and Harris. Proc. Biol. Soc. Wash., XLI, p. 25, 1928.
3. Drake and Harris. Annals of Carnegie Museum, XXIII, pp. 181-182 and 224-225, 1934.

NOTICE.

The Thirteenth Annual Meeting of the Kansas Entomological Society will be held April 3, 1937, in Fairchild Hall, Kansas State College, Manhattan, Kansas, in Room No. 52, beginning at 10 A. M.

A NEW SPECIES OF PHYLLOPHAGA AND NOTES ON ANOTHER SCARABAEID (COLEOPTERA)

MILTON W. SANDERSON*

Phyllophaga (Phytalus) omani n. sp

Length, 14 mm.; width, 6 mm.

The present species, according to Horn's key (Trans. Am. Ent. Soc., XII, 1895, p. 119) would come out near **cephalicus** Horn. In Saylor's table of the species of this group, to appear shortly, it runs to **georgianus** Horn. to which it is evidently more closely related.

Form elongate, cylindrical, but little wider behind. Color yellow-testaceous, the head piceous... Surface shining.

Antennae 9-segmented, the club as long as the entire stem, nearly uniformly colored as the remainder of body. Clypeus, and entire head, strongly transverse, the clypeus more than three times wider than long, rather deeply emarginate and excavated with the margin moderately reflexed. Fronto-clypeal suture lightly impressed. Front and clypeus moderately and not closely punctured, the punctures generally separated from one to several times their own diameters.

Pronotum moderately, rather unevenly punctured, the punctures closer along the anterior and posterior margins. Pronotum nearly twice as wide as long; sides sub-parallel in basal half, widest at middle, then gradually rounded to apex which is considerably narrower than at base. An indistinct fuscous spot on each side near rounded lateral margins. Basal marginal line distinct at sides.

Elytra 10 mm. in length, widest near middle. Punctures of elytra of nearly the same size as those on the pronotum, and irregular; a little rugose near the suture. Sutural costae distinct with an irregular row of punctures along each from base to apex. Discal costae obsolete. Marginal hairs entirely absent.

Pygidium rather strongly convex, nearly four-fifths as long as wide, finely and evenly punctured with a few short stiff hairs at apex; the apex evenly rounded. Entire upper surface glabrous.

Elevated portion of prosternum behind front coxae

*Contribution from Dept. of Entomology, University of Kansas.

very prominent, rather narrow and broadly emarginate at apex.

Abdomen finely punctured from side to side. the punctures becoming obsolete on the meson. Abdomen perceptibly flattened at middle and with a vague longitudinal impression on segments three and four. Pubescence nearly absent except on the penultimate segment which has an irregular transverse row of erect hairs on either side of middle; otherwise this segment is unmodified. Last abdominal segment slightly excavated at middle and with a small punctate elevation on each side; a row of erect hairs extending from each elevation to side of segment.

Posterior tibiae with one spur fixed and very short, the inner slender and a little longer than the first tarsal segment. The upper portion of claw nearly as wide at base as lower and distinctly longer. Claws very finely and longitudinally striate, the striae close and generally following the curve of claw. Lower margin of claws very finely and minutely irregularly crenulate.

Holotype, male, Burnsville, Ala., July 20, 1930, P. W. Oman, from which the above description is drawn. **Allotype,** female, Prattsburg, Ga., 7-24-30, R. H. Beamer, collected at light. I have associated the two sexes for they agree perfectly in the puncturation of the scutellum, the longer lower tooth of claw, and the crenulate lower margin of claw. The female has the antennae 9-segmented, the club a little shorter than the funicle. Both spurs of hind tibiae free. Mesosternum sparsely punctured and with a few very short hairs. Abdomen slightly flattened at middle and with a few moderately coarse punctures along the sides; penultimate segment irregularly punctured at sides and on posterior half. Pygidium transverse and evenly punctured. Body behind a little more robust than in the male.

This insect has a strong superficial resemblance to **Phyllophaga gracilis** (Burm.) by its strongly transverse head and pronotum. It is easily separated from **georgianus** Horn (of the Phytalus Group) as follows: the scutellum is only distinctly punctured along the sides; the lower tooth of the claw is fully two-thirds that of the upper; and the fixed spur of the hind tibia is directly continuous with the tibial margin. In **georgianus** the

scutellum is evenly punctured over the entire surface; the lower tooth of claw is not more than one-half the length of the upper; and the entire apical margin of posterior tibia is distinct. Comparison of the male genitalia shows this organ to be much less stout than that of **georgianus** although of the same general shape. There is also a similarity to that of **glaberrima** (Blanch.). Indeed all three species have the elevations on the last abdominal segment as described for **omani.** However, **glaberrima** has the tooth of the claw very small and intramedian.

Leptohoplia testaceipennis Saylor

1935 Pan-Pacific Entomologist, XI, 3, pp. 132-134.

The new genus and species, **Leptohoplia testaceipennis** Saylor, was described from three males from Imperial County, California, collected during June and July, 1912, by J. C. Bridwell. At the time this description appeared, I had in manuscript a description of this species. Since Saylor had but one sex of the species, the female is here described and designated as **allotype.**

The female agrees in all essential characters with the male except as follows:

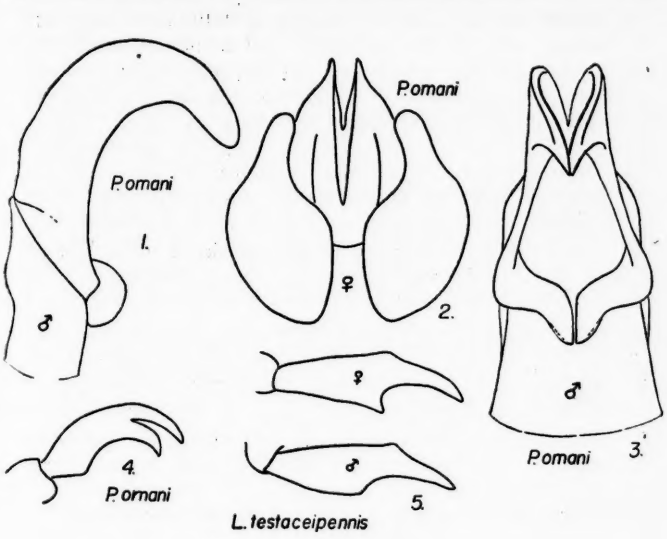
The 3-segmented antennal club of the female is but slightly shorter than the stem, whereas that of the male is one-third longer than the stem. The posterior tooth of anterior tibia of female is acute and considerably less than right angled, while that of the male is blunt. The first posterior tarsal segment of the female is distinctly shorter than the width of posterior tibia at apex. In the male, this tarsal segment is distinctly longer than the width of tibia. A further comparison shows that the posterior tibiae and tarsi of the female are proportionately broader and shorter than those of the male.

Allotype female, Holtville, Calif., July 2, 1929, R. H. Beamer. Three additional males collected with the female.

Types of the above species deposited in the Snow Collection.

Explanation of Drawings

1. Right lateral view of aedeagus.
2. Ventral view of pubic process of female.
3. Ventral view of aedeagus.
4. Tarsal claw.
5. Anterior tibiae of male and female.



THE GENUS EUPHALERUS IN AMERICA NORTH OF MEXICO (PSYLLIDAE: HOMOPTERA)

L. D. TUTHILL, Iowa State College, Ames, Iowa

The Psyllidae (Chermidae) upon which this paper is based were very kindly loaned to the writer from the Snow Entomological Collection at the University of Kansas by Dr. R. H. Beamer. The genus **Euphalerus** is represented in North America north of Mexico by seven species, four of which are described for the first time in this paper. The type of the genus **E. nidifex** Schwarz is included although it has not been recorded from the mainland of North America.

Key to North American Species of Euphalerus.

1. Color reddish brown, including wings, male forceps not simple ..... 2.

Color not as above (mostly greenish in appearance); male forceps simple and acute at apex ..... 3.

2. Large species (3.75 mm. in length), genal cones longer than vertex; male forceps with a heavy, slightly T shaped tooth medially at apex ..... **adustus** n. sp.
Small species (2.50 mm. in length), genal cones shorter than vertex, male forceps appearing folded ..... **tantillus** n. sp.

3. Entire body including wings speckled with brown or black dots and spots ..... **nidifex** Schwarz.
Body not speckled with brown or black spots ..... 4.

4. Forewings rounded at apex ..... 5.
Forewings distinctly rhomboidal..**propinquus** Crawf.

5. Wings with one or more prominent maculae ..... 6.
Wings not maculated ..... **rugipennis** Crawf.

6. Veins of forewings extremely prominent, strongly raised, distinctly marked with rather regularly spaced white spots ..... **jugovenosus** n. sp.
Veins of forewings normal, without white spots .... 7.

7. Forewings covered with a white, waxy powder, with a single prominent black spot at extremity of clavus ..... **beameri** n. sp.
Forewings hyaline, whole apical margin more or less maculated ..... **vermiculosus** Crawf.

Euphalerus adustus n. sp.

Resembling **E. rugipennis** Crawford but a larger, reddish species without the characteristic white spots; wings less rugose. Length to tip of folded wings 3.75 mm.

Color. Uniformly yellowish red, some white vermiculations on head and thoracic dorsum. Wings brown, apical portion faintly cloudy. Abdomen sometimes greenish.

Structure. Body large, finely punctate. Vertex twice as wide as long, flat, smooth, pubescent on anterior margin. Antennae one and one half times as long as width of head, genal cones large, as long as vertex, rounded, swollen in appearance, rather acute, prominently pubescent, thorax strongly arched. Forewings rugose, about two and one half times as long as wide, pterostigma large, vein Rs sinuate. Abdomen large, extending almost to apex of wings.

Genitalia. Male proctiger large, typical in shape.

Forceps large, almost as long as proctiger, straight and very broad in either lateral or caudal view; anterior margins heavily pubescent to roundly truncate apex; postero-medial margins produced into heavy, slightly bifid, somewhat T shaped teeth, extending barely beyond apex. Female genital segment about half as long as rest of abdomen, evenly narrowed to rather acute apex.

Holotype male, allotype female, and one female paratype, Weber Canyon, Utah, July 4, 1931, R. H. Beamer; one female paratype Maybell, Colorado, June 30, 1931, R. H. Beamer; one male paratype Fks. Logan Can., Utah, Aug. 21, 1934, C. F. Smith and T. O. Thatcher.

Holotype, allotype and one female paratype in Snow Entomological Collection, Univ. of Kansas; one female paratype in author's collection; male paratype in U. S. N. M., Washington, D. C.

Euphalerus tantillus n. sp.

Resembling **E. adustus** n. sp., but much smaller and with distinctive genitalia, the female genital segment subglobose at base with a styliform prolongation, the male forceps folded in appearance. Length to tip of folded wings 2.50 mm.

Color. Brownish red with some indistinct, lighter markings on head and thorax. Forewings reddish fumate.

Structure. Head large, strongly deflexed. Vertex twice as wide as long, with prominent impression on each side, somewhat bulging in front, very slightly pubescent on anterior margin. Antennae slightly longer than width of head. Genal cones moderately large, two thirds as long as vertex, quite conical in shape, with sparse, short pubesence. Forewings slightly more than twice as long as wide, rugose, pterostigma small.

Genitalia. Male proctiger large, heavy, parallel sided to truncate apex; forceps about two thirds as long as proctiger, in lateral view broad and much enlarged at apices, in caudal view very broad at base, sharply narrowed and moderately broad to apices, medio-posterior margins produced anteriorly to give an appearance of a folded structure which appears bifurcate from dorsal view. Female genital segment slightly longer than rest of abdomen, very large at base, suddenly narrowed to a slender, acuminate process, with very long prominent

hairs on basal portion.

Holotype male, allotype female, six male and three female paratypes, Salt Lake City, Utah, July 3, 1931, R. H. Beamer.

Holotype, allotype and paratypes in Snow Entomological Collection, University of Kansas; one pair of paratypes in author's collection.

Euphalerus nidifex Schwarz

Euphalerus nidifex Schwarz, Proc. Ent. Soc. Wash., VI, p. 153, 1904

This West Indian species is greenish white, covered over the entire surface, including legs and wings, with brown or black spots. In this it differs from all species found in the United States, but resembles **E. championi** and other Central American species. I have not seen any specimens of this species.

Euphalerus vermiculosus Crawford.

Euphalerus vermiculosus Crawford, U. S. N. M. Bull. 85, p. 121, 1914.

This insect is quite typical of a number of species found in the western United States. Its general color is greenish white to yellowish white, the thorax darker. The wings are semihyaline, fumate in apical part, the apical margin alternately black and white. The forceps of the male are slender, with a sharp, black hook at the apex, the proctiger is simple. The female genital segment is short, heavy and acute at apex.

Specimens have been examined from Siskyou National Forest, Dunsmuir, Dales and Eureka, California; Hood River and Biggs, Oregon; Haugan, Montana.

Euphalerus propinquus Crawford

Euphalerus propinquus Crawford, U. S. N. M. Bull. 85, p. 122, 1914.

This species may readily be distinguished from all other members of the genus by the rhomboidal shape of the wings. Its color is very much like that of **vermiculosus.**

Specimens are at hand from the Huachuaca and Chiricahua Mountains of Arizona.

Euphalerus rugipennis Crawford

Euphalerus rugipennis Crawford, U. S. N. M. Bull. 85, p. 120, 1914.

(To be continued in Vol. 10, No. 3)

REPRINT PRICES

JOURNAL OF THE KANSAS ENTOMOLOGICAL SOCIETY.

pp.	25 cop.	50 cop.	100 cop.	500 cop.
1— 2	$ .50	$ .75	$ 1.40	$ 6.50
3— 4	1.00	1.75	2.80	11.00
5— 8	1.40	2.80	5.60	20.00
9—12	2.00	4.00	8.00	32.00
13—16	2.50	5.00	9.00	36.00
17—20	3.00	6.00	10.00	40.00
21—24	3.50	7.00	11.00	44.00
25—28	4.00	8.00	12.00	48.00
29—32	4.50	9.00	13.00	52.00
Tables—for setting up—$1.75 per page.				
Covers	—	—	2.50	7.50

Charges for postage or express on carriage of reprints are extra.

PRICES OF BACK VOLUMES

Volume 1 ..... $2.00
Volumes 2 to 8 ..... 1.00
Volume 8 ..... 1.50

Send your subscriptions for back volumes or numbers to the Secretary-Treasurer, Department of Entomology, K. S. C., Manhattan, Kansas.

CONTENTS OF THIS NUMBER

SOME NEW SPECIES MICROVELIA (VELIIDAE, HEMIPTERA) (CONCLUDED)—A. P. McKINSTRY 37
NEW SPECIES OF STONEFLIES (PLECOPTERA)—P. W. CLAASSEN 42
NOTES ON THE LIFE HISTORY OF THE BRONZED CUTWORM IN KANSAS—H. H. WALKDEN 52
NOTES ON HEBECEPHALUS WITH THREE NEW SPECIES (HOMOPTERA CICADELLIDAE)—R. H. BEAMER 59
A NEW POTAMOBATES FROM MEXICO (HEMIPTERA-GERRIDAE)—H. B. HUNGERFORD 63
NOTICE 65
A NEW SPECIES OF PHYLLOPHAGA AND NOTES ON ANOTHER SCARABAEID (COLEOPTERA)—MILTON W. SANDERSON 66
THE GENUS EUPHALERUS IN AMERICA NORTH OF MEXICO (PSYLLIDAE: HOMOPTERA)—L. D. TUTHILL .. 69

JOURNAL OF THE KANSAS ENTOMOLOGICAL SOCIETY

Publication Office, 119 South Main Street, McPherson, Kansas.
W (arren) Knaus, Publisher

A quarterly journal published in January, April, July and October devoted to Entomology in the Western Mississippi Basin and the proceedings of the Kansas Entomological Society.

Manuscripts for publication may be sent to any of the publication committee.

The Kansas Entomological Society does not make exchanges since the Society does not maintain a library.

Subscription to the Journal must be paid in advance. The subscription rate is so low that second notices are not ordinarily sent out.

Payment of Canadian or other foreign subscriptions and bills must be made by International Postal Money Order or by a draft on a New York bank and payable in U. S. A. dollars.

Subscribers are urged to give us their full cooperation in these matters.

Subscriptions should be sent to the office of Publication, 119 South Main Street, McPherson, Kansas.

Subscription in the U. S. A.,	**$1.50 per year**	**Single Copy**
Canadian or foreign subscriptions,	**1.75 per year**	**60 cents**

KANSAS ENTOMOLOGICAL SOCIETY

President D. A. Wilbur, Kansas State College, Manhattan.
Vice-President, L. C. Woodruff, University of Kansas, Lawrence.
Secy.-Treas., R. L. Parker, Kansas State College, Manhattan.

Volume 10, No. 2, April, 1937. **Mailed March 29, 1937.**

. . 37
. . 42
. 52
. . 59
. . 63
. . 65
. . 66
. . 69

sas.

d Oc-
n and

blica-

anges

e sub-
t out.
bills
aft on

these

. 119

Copy
nts

ce.

1937.